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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE - JULY 14, 1945

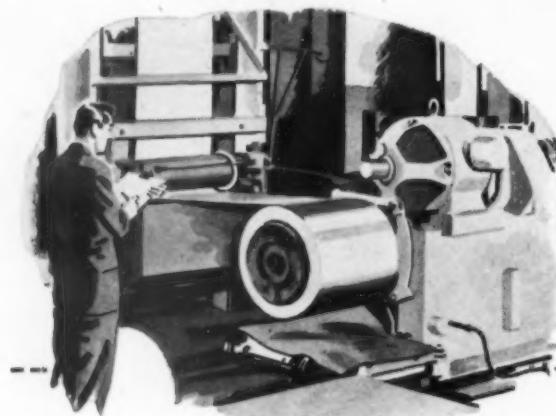


Agile Aerialist
See Page 24

A SCIENCE SERVICE PUBLICATION

In an Army tank a GUNNER fires with deadly accuracy — while charging across rough terrain — because of a gun stabilizer, officially recognized as one *outstanding advantage* of our tanks over those of the enemy.

... the name on the **GUN STABILIZER** is
Westinghouse.



In a laboratory a SCIENTIST uses a micro-balance to weigh a *single layer of oxygen atoms* — $1/50,000,000$ th ounce — to determine the corrosion resistance of special alloys at high temperatures.

... the name on the **MICRO-BALANCE** is *Westinghouse.*



In a steel mill an ENGINEER uses an induction heater to fuse a mirror-like surface on dull electrolytic tin plate — helping to conserve *two-thirds* of our war-scarce tin supply.

... the name on the **INDUCTION HEATER** is
Westinghouse.



In a bomber a BOMBARDIER "pin-points" his target with an American bombsight — controlled by a gyroscope which is driven by an electric motor, balanced to $1/10,000$ th ounce.

... the name on the **ELECTRIC MOTOR** is *Westinghouse.*

TODAY — Westinghouse is producing vital war equipment and weapons, many of which must remain secret until after final Victory.

TOMORROW — These wartime developments will be turned to peaceful uses — products for industry and the home, backed by Westinghouse research, engineering, and precision manufacture.

Westinghouse
PLANTS IN 25 CITIES OFFICES EVERYWHERE

PHYSIOLOGY

Answer to Muscle Riddle

The question of how living muscles contract and relax subject of research by Hungarian Nobelist during Nazi persecution.

By MAXIM BING, M.D.

► THE QUESTION of how living muscles contract and relax seems to have been answered by research by Prof. A. de Szent-Gyorgyi of Hungary, winner of the Nobel Prize for his isolation of vitamin C.

The muscle research, finished by Prof. de Szent-Gyorgyi during severe persecution by German and Hungarian Nazis, was reported in full at a meeting of the Hungarian Society for Natural Sciences, the first public act of scientific life after Hungary's liberation.

Discovery of a previously unknown protein and its role in muscle contraction were reported by Prof. de Szent-Gyorgyi. He and his collaborator, Bruno Staub, named this protein actin.

Under certain conditions, actin forms filaments consisting of globular particles arranged in a string like the beads of a rosary. These actin filaments or strings of beads unite with another previously discovered muscle protein, myosin. Rod-shaped particles of myosin cling together side by side and at their ends adhere to the globules of the actin string.

When a potassium salt is added, the myosin is precipitated. The consequent shrinkage bends the actin string toward the side of the shrinking myosin. The shortening which follows is seen as muscle contraction.

The myosin particles are attached to the actin string in a spiral pattern which much resembles a winding staircase, the actin particles forming its axis and the myosin particles its steps. Through muscular contraction, the complete system assumes the shape of a corkscrew.

The cross-striation of voluntary muscles of the body is due to this spiral arrangement of the clusters of myosin-actin systems of which the muscle fibers are composed, Prof. de Szent-Gyorgyi reports.

This has been proved by rotating the muscular fibrils under the microscope. During such rotation, the cross striation moves along the axis of the fiber. This explains the difference between cross-striated muscle, such as that in the arms, and smooth muscle such as that of the heart. Inside smooth muscle, the actin-

myosin systems are less closely packed and thus neighboring actin-myosin spirals differ in their phases.

The three known conditions of muscles, relaxation, contraction and rigor mortis (the stiffness of the muscle shortly after death), are accounted for by Prof. de Szent-Gyorgyi's findings. Like myosin, actomyosin is precipitated by potassium chloride. If this reaction is performed in the presence of another chemical, adenosintriphosphate, the actomyosin not only precipitates but contracts.

This precipitation and contraction is limited to a very narrow range of salt concentration, outside of which the actomyosin splits into actin and myosin. Furthermore, the range of concentration depends also on the adenosintriphosphate concentration. Very slight variations of either cause a transition of the dissociated (relaxed) system into the contracted one.

Relaxation of muscles corresponds to the dissociated actin-myosin system. Contraction of muscles corresponds to the associated one, while rigor mortis corresponds to the salt precipitation of actomyosin through decomposition in the absence of adenosintriphosphate.

Actin was discovered during investigation of what happened during a mistake, as scientists considered it, in extracting myosin from muscles.

The consistency of myosin differs considerably according to the duration of the process of extracting it. Short extraction yields a thin fluid. Prolonged extraction produces a jelly. Previous researchers usually discarded the jelly-like product, believing it to be the result of having "spoiled" the process of extraction.

Prof. de Szent-Gyorgyi, however, prepared filaments from the jelly-like product and immersed them in a muscle "soup," that is, a boiled extract of muscle tissue. The filaments from the "spoiled" extraction contracted vigorously. Prof. de Szent-Gyorgyi thus reproduced the vital function of muscle in the test tube and made it accessible for analysis.

Prof. de Szent-Gyorgyi's results seem to open new vistas for explaining the nature of wave excitation and the mech-



Prof. de Szent-Gyorgyi

anism of neural action. They represent a new approach to one of the oldest and most important problems of biology. He has been invited by the Soviet government to give a number of lectures in Moscow about his fundamental researches.

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VOLCANOLOGY—AERONAUTICS

Army Helicopter to Hover Over Mexican Volcano

► A U. S. Army Sikorsky helicopter will shortly hover over Paricutin volcano in order to discover for the joint Mexican-U. S. volcano commission secrets of this geological wonder that burst forth from a cornfield two and a half years ago.

In this scientific exploration the Army's Air Technical Service Command will study performance of the latest model R6A helicopter under conditions of high altitude, turbulence and temperature similar to those in the Pacific war theater which do not exist anywhere in the United States. While making the scientific flights, Capt. George D. Colchagoff and Flight Officer Roy P. Beer, with 200 hours of helicopter experience, will be investigating rescue, observation, supply and liaison uses of the helicopter.

The first helicopter to be used in scientific collaboration with any country has arrived in Mexico dismantled in a C47 Army transport so snugly packed that only one inch space remained. The

helicopter is being assembled and flown to a base three miles from the volcano in full view of the cone.

Igor Sikorsky, designer of the helicopter, will participate in the double-barrelled helicopter volcanological observations. Geological work will be directed by Dr. L. C. Graton of Harvard and Dr. Ezequiel Ordóñez, Mexican geologist, while Dr. O. H. Gish of the Carnegie Institu-

tion of Washington is in Mexico to study the electrical phenomena of the volcano which results in lightning-like discharges with accompanying thunder within the erupting material.

From the leisurely hovering helicopter the scientists expect to look down the throat of erupting Paricutin to discover what happens there, accomplishing in a half hour what ordinarily takes days.

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MEDICINE

Neostigmine for Polio

Has been found disappointing in acute cases, but two medical groups believe it should get further trial. Recovery said to depend on nervous system damage.

WITH the infantile paralysis season at hand, physicians will read in the *Journal of the American Medical Association* (July 7), that:

1. A synthetic chemical called neostigmine plus hot packs help relax muscle spasm a little, or temporarily, in acute cases and are promising enough to warrant further trial and study.

2. The amount of ultimate recovery from infantile paralysis depends primarily on the extent to which the central nervous system was involved and not the type of treatment.

Studies of neostigmine treatment are reported by two medical groups: Drs. Henry Brainerd, Hilliard J. Katz, Albert Porter Rowe, Jr., and J. C. Geiger, of San Francisco, and Drs. M. J. Fox and W. H. Spankus, of Milwaukee.

The point about recovery depending on amount of nervous system involvement is made by Dr. Mary S. Sherman, of Chicago.

The use of neostigmine for infantile paralysis was first suggested by Dr. Herman Kabat, now with the U. S. Public Health Service, and Dr. Miland E. Knapp, of the University of Minnesota, in 1943. They reported the chemical relieved the excessive muscle tone or tension and the muscle spasm and helped reduce incoordination. Neostigmine, also called prostigmine, had heretofore been used successfully to relieve fatigued muscles in myasthenia gravis, a disease of muscle weakness.

The San Francisco group reports from their studies that neostigmine relaxes muscle spasm at least temporarily, that its value requires further proof but that its further use is "definitely warranted"

under controlled conditions.

"The Kenny treatment with or without neostigmine is an effective method of preventing contracture and deformity," they also report, adding they found neither proof nor disproof that either neostigmine or Kenny packs reduced the incidence of paralysis.

The Milwaukee doctors were disappointed at finding no pronounced or even consistent relaxation produced by neostigmine. They felt their results differed from those of Drs. Kabat and Knapp because all the Milwaukee cases were acute, whereas chronic cases predominated in the group treated by Drs. Kabat and Knapp. Using neostigmine with hot fomentations, the Milwaukee doctors believed a persistent and perceptible relaxation of spastic muscles resulted in most cases and that this treatment should be used further.

The condition of 70 patients stricken by paralysis in 1943 and examined 18 months later is the basis for Dr. Sherman's report. These patients were not treated with Kenny packs, splints or special apparatus. They were kept at absolute rest in bed and given as nearly normal a diet as possible. As soon as the pain and fever subsided, physical activity with early active exercise under water was started. The patients were got up and encouraged in the normal use of their legs and arms as soon as possible.

Of the 64 survivors, 13 had no detectable weakness at any time, 44 had some muscle weakness but are not now handicapped, six have "functionally significant weakness," but require no further treatment, and seven require braces or operations. No patient has gotten worse during the 18 months and major

improvements, as expected, have occurred without exception in those patients who were not completely paralyzed.

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Bauxite deposits in Oregon are the only known commercial reserves of this material for making aluminum in the United States west of the Rockies.

Horse serums are used for the production of antitoxins because they are more easily borne by the human organism in large quantities than those of most other animals.

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MEDICINE

Trench Mouth Remedy

Penicillin brings speedy recovery from this disease. Pain and other symptoms completely banished in 48 hours in the first 14 patients treated.

► PENICILLIN can bring speedy recovery from Vincent's angina, popularly known as trench mouth, it appears from two reports in the *Journal of the American Medical Association* (July 7).

Decided improvement in four to six hours, with pain and other symptoms completely banished in 48 hours, was achieved in the first 14 patients treated by Capt. Bernard M. Schwartz, Army Medical Corps, at the A.A.F. Regional Hospital at Truax Field, Madison, Wis. Altogether Capt. Schwartz has now treated 41 patients with similarly good results. He recommends giving the penicillin by hypodermic injection into the muscles in 20,000 unit doses every three hours until 100,000 units have been given.

Results with intramuscular injections were "so dramatic" that this method, giving 25,000 units of penicillin for four doses at three-hour intervals, is called "apparently the optimal treatment of Vincent's angina" by Maj. Paul L. Shallenberger, Lt. Col. Earl R. Denny and Maj. Harold D. Pyle, Army Medical Corps, in the second report.

Before trying the injections of penicillin, these medical officers had treated trench mouth patients at Gardiner General Hospital by swabbing a solution of the mold chemical directly onto the sore, ulcerated places in the patient's mouth. In these patients the ulcers showed marked improvement in 24 to 48 hours and pain in those who were suffering severely was rapidly relieved.

Comparing the results of penicillin treatment with other methods, including sulfadiazine lozenges, Maj. Shallenberger and associates found that the germs causing the trouble disappeared in 3.7 days, on the average, in the penicillin-treated group. The average time for this was 7.1 days in the group getting sulfadiazine lozenges and 8.8 days in the group treated with the standard trench mouth medicines, sodium perborate and hydrogen peroxide, chromic acid and silver nitrate, and oxophenarsine hydrochloride.

The most rapid response, however, came in a patient who was given 15,000 units of penicillin injected into the muscles every three hours for eight doses. Pain disappeared in six hours and the germs could not be found after 11 hours.

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TOUGH TIRES—Chemicals used in compounding rubber are ground and mixed in this ball mill at the Firestone Tire and Rubber Company's research laboratory. The chemicals (also called compounds or pigments) are ground up by the stones as the jars turn on rubber rollers in the mill.

the development of new products and the improvement of those now in use.

The building is a three-story brick structure, air-conditioned, and containing approximately 100,000 square feet of floor space. It has prefabricated steel inner partitions which can be moved to completely rearrange the interior as desired. It is equipped with modern facilities and with the latest scientific apparatus, including an electron-microscope that magnifies up to 100,000 times compared with 2,000 for more ordinary microscopes.

Among the special equipment are a forced vibrator to determine properties of rubber in motion; a plastometer to measure processibility of rubbers and rubber-like materials, and a relaxometer to study the effects of heat and oxygen on stretched rubber.

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Wood and wood products are still on the war critical list because of the unprecedented demand for lumber, pulpwood, plywood and other materials.

During one season, an active bee colony, gathering about 65 pounds of pollen, will have visited and provided free pollination for roughly a half-billion flowers.

ENGINEERING

Good for 100,000 Miles

Automobile tires that are practically blowout-proof and with non-skid qualities are expected. Progress toward these objectives is promising.

► AUTOMOBILE tires that will run 100,000 miles, practically blowout-proof and with greater non-skid qualities, are ultimately expected, declared John W. Thomas, directing head of the Firestone Tire and Rubber Company, in discussing the new \$2,000,000 Firestone research laboratory.

"No one can estimate accurately how long it will be before such tires are on the market," he said, "but there is little question that through the limitless capacities of research these objectives may be achieved."

"A tire that would run 3,500 miles was the goal of the rubber industry several

decades ago," Mr. Thomas stated. "Now it's not unusual for passenger car tires to run ten times that far and it is no trade secret that we ultimately expect to produce a tire that will run 100,000 miles.

"We know how to make blowout-proof tires," he added, "and we are making progress on the development of tires that are puncture-proof and have greater non-skid qualities."

The new laboratory was designed and constructed under the direction of Mr. Thomas who was the company's first chemist. It will be devoted entirely to research. It will serve as the focal point of the company's extensive program for

ASTRONOMY

"Hidden" Stars Studied

Astronomers have found a way of getting beyond the blaze of light of some of the hottest stars to study the hidden light of their cooler companion.

► ASTRONOMERS have found a way of getting through the blaze of light of some of the biggest and hottest stars in the universe to tune in on the hitherto hidden light of their cooler companion stars.

Even though the fiery companion may be much hotter than its cooler brother star, it is possible to distinguish between the two stars and estimate the size and distance of the cooler companion by means of the star's infrared light, invisible to the naked eye.

In the infrared part of the spectrum the light of the "hidden" star overwhelmingly predominates and tells its own story without interference from its white-hot companion, Dr. P. C. Keenan of the Yerkes Observatory of the University of Chicago and Dr. J. A. Hynek of the Perkins Observatory of Ohio Wesleyan University and Ohio State University, both now doing war research, report. (*Astrophysical Journal*, May.)

Ability to determine the distances and sizes of the cooler stars from the relative intensities of selected lines in the infrared spectrum resulted from the development of more efficient spectrographs and of photographic plates much more sensitive to infrared light. The recently-

installed infrared spectrograph attached to the 69-inch reflector, the fifth largest telescope in the world, of the Perkins Observatory, was used in studying the stars.

The new method proved particularly effective in the case of stars whose temperature ranged from about 4,000 to 7,000 degrees Fahrenheit, which are particularly rich in light to which ordinary photographic plates are not sensitive.

Astronomers can now estimate the distance of these stars simply by examining the infrared spectrum. In the past much could be told about the hotter stars from the ordinary visible region of the spectrum, but the infrared end was not examined separately.

One of the double stars studied by means of its infrared spectrum was the famous eclipsing pair, VV Cephei, the red component of which is one of the largest stars known. Peculiarities which cannot be detected by visible light were revealed—the ultraviolet light of the hot companion acting on the "red" star excites spectral lines which are entirely foreign to a normal cool star. These lines can be used as sensitive indicators of the relative physical condition of the two whirling components.

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PHYSICS

Fantastic Nazi Claim

German report of a stratosphere platform that would float 5,000 miles above the earth seems tall story when analyzed. Still plenty of gravity at that height.

► WHEN German scientists are reported to have been working on a "master secret weapon consisting of stratosphere platforms to float 5,000 miles above the earth from which death rays could be focused on any part of the world," Jules Verne must have stirred uneasily in his grave.

For this tall tale, relayed from an Army press conference in Paris, is by no stretch of the imagination in the same class with the very real and technically effective V-1 and V-2 German bombs and rockets. Even Verne's fantasies, many of

which were materialized in a sense by scientists of later generations, were at least plausible by the scientific knowledge of his day.

Putting anything 5,000 miles above the earth and making it stay there would be difficult. The effect of gravity by no means disappears at that height. A 150-pound man would weigh 30 pounds at that distance from the center of the earth because gravity varies with the square of the distance. (The earth's surface is about 4,000 miles from the earth's center, so you can figure this for yourself.)

It would take a lot of energy to be supplied to jet or rocket devices just to keep any sort of structure at that distance above the earth, to say nothing of getting it there in the first place. Balloons and propellers would not do in that airless region.

With the practical development of some kind of subatomic energy, which has long been a dream, it might be possible to have enough energy in sufficiently small weight to solve the problems involved, but who knows whether the energy of the atom will ever be tapped?

Supplying oxygen to the human beings to man the platforms would be somewhat like supplying the pilots who fly at high altitudes. This would not be impossible, although the supply problem of transporting the necessary oxygen from the earth's surface, even if some regeneration method were used, would not be a simple one.

At such heights beyond the protecting ozone that cuts off much of the sun's ultraviolet radiation, any unshielded human would indeed find the sun's rays death rays. But protecting the crew against the sun's rays would not be insurmountable.

As for the giant sodium mirrors supposed to be placed on these platforms for collecting and focusing the sun's rays, they would not be as formidable weapons as the Schrecklichkeit imaginations of the German scientists would imply. (Why complicate the design by suggesting mirrors of sodium, a metal that in air or moisture bursts into flame spontaneously? Aluminum would do quite well.) As in all burning-glass devices, the light collected would need to be concentrated upon a much smaller area than the collecting surfaces. If the mirrors on high were two or three square miles in area, they could not do as much damage as a few B-29 loads of incendiaries.

Evidently there are still grandiose ideas among the Nazis questioned or our Army investigators got hold of some party leaders more fantastically indoctrinated than scientific. There may be some interesting and useful researches that the Germans had underway, but the chances are they will be closer to earth than this one.

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The *banana* is the largest of all plants that do not have a woody stem above ground; the true stem of the banana is below ground, and the part above is a leaf sheath and is called the "false stem."

PUBLIC HEALTH

Plasma for Civilians

The Red Cross will continue to operate the blood donor service which has successfully supplied blood, plasma and albumin to the armed forces.

► ONE ANSWER to the question of where to get blood and blood plasma for civilians now and in the postwar world is given in a new policy announced by the American Red Cross.

The Red Cross will continue to operate for civilians the blood donor service which has been so successful in supplying blood, plasma and albumin to the armed forces.

* Victims of accidents and burns, mothers in childbirth and other patients desperately needing blood or one of its fractions will not, as in prewar days, have to depend on finding a relative, friend or professional donor with the right blood type. Doctors who have learned through their war experience to use blood and plasma liberally will not be hampered in their lifesaving efforts by lack of supplies of the vital fluid.

Details of the new Red Cross service are given in a report in the *Journal of the American Medical Association* (July 7).

Red Cross chapters will be authorized to set up blood donor centers in communities requesting it. The centers will be operated in cooperation with a sponsoring health or medical agency which meets standards specified by the Red Cross. Such an agency might be a health department or a medical society. This agency would be responsible for technical operations, staff and equipment.

No charge may be made to patients, hospitals, clinics or physicians for the blood or blood derivatives. Costs of donor recruitment, operating costs and costs of processing the blood must be paid by some other means than charging the patient, doctor, hospital or clinic for the blood. In Michigan, the state is financing such a program and other states have appropriated money for this purpose.

The Red Cross will take part only in a blood donor program that services the entire community. Blood given by members of the community to the Red Cross must be freely available to anyone in the community needing it, seems to be the idea here.

If a community is serving as a source of blood for the Army and Navy, the Red Cross will not cooperate in a civil-

ian service unless the amount of blood required for civilians can be obtained over and above the needs of the armed forces.

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AERONAUTICS

Giant Clipper Capable of Five Miles a Minute

► A GIANT Clipper capable of cruising at five miles a minute and carrying 204 passengers will provide worldwide air service in postwar days within the means of the average man, it is announced by Pan American World Airways. It is the largest of four new clippers for which plans are completed

which are designed to meet future requirements of international high-speed air transportation.

This largest Clipper is the Consolidated-Vultee six-engined CV-37, Clipper 11. It will carry a payload of slightly less than 50,000 pounds, made up of 204 passengers and 14,000 pounds of baggage, mail and express. With a speed of 340 miles per hour, it will be able to fly from New York to London in about nine hours. It will be pressurized and air-conditioned for operation at an altitude of 25,000 feet.

A double-decked Lockheed four-engined L-89, Clipper 10, will carry 128 passengers and a crew of 11 at 300 miles an hour with a range of 2,300 miles. Clipper 9 is a Douglas four-engined DC-7 which will carry 108 passengers at 300 miles an hour and will have a range of over 2,500 miles. Clipper 8 is a four-engined Lockheed Constellation for express schedules on medium-range routes of over 1,500 miles. Its speed is 300 miles per hour and its capacity 56 passengers.

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"BRAIN TEST"—The General Electric computer for accurate gunfire in the B-29 bombers is given an accuracy test. Inputs of range, elevation and azimuth, gun position, altitude, airspeed, and air temperature are introduced into the computer. Outputs consisting of elevation and azimuth correction angles are checked against calculated output data. Installed on a B-29, the computer automatically calculates with split-second precision the parallax, windage, gravity drop, and lead corrections and adds them into a total correction. Result is that the turrets are "fooled" into pointing their guns so that bullets and target arrive at the same point at the same time.

CHEMISTRY

Super-DDT Discovered, But Not Yet Available

► A SUPER-DDT, a synthetic compound even deadlier to insects than the original DDT, has been discovered by British chemists. It is known by the convenience-name of Gammexane, and is sometimes referred to by the Apocalyptic number 666. Its exact chemical designation is the gamma isomer of benzene hexachloride.

It is not particularly closely related to DDT in its structural chemistry, but it seems to be even more of a knockout so far as insects are concerned. By a curious coincidence, its history is like that of DDT in that its existence had been known for a long time, but its insecticidal properties had not been suspected until it was tried out relatively recently. Then it was discovered to be the deadliest weevil poison that the British firm's chemists had ever tested, and it would kill flies in half the concentration required in a DDT solution. It was also proven to be deadlier than DDT to *Aedes egypti*, the mosquito that carries yellow fever.

There are, however, some points about Gammexane that have not yet been cleared up. It is not known, for example, if it is as persistent under conditions of ordinary use as DDT, which is known to remain toxic to insects for months. Lime, which is used a great deal in agricultural sprays and dusts, is known to be destructive to Gammexane; how to obviate this difficulty has yet to be worked out.

Gammexane is not yet commercially available in the United States, but presumably will eventually appear in the market here.

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PUBLIC HEALTH

Increase in Polio Cases Not Cause for Alarm

► AN INCREASE in infantile paralysis cases throughout the nation was reported to the U. S. Public Health Service for the week ending June 30. The total was 155, with reports not yet received from Mississippi and Rhode Island, which reported one and no cases respectively the previous week. The total for the week of June 23 was 116.

Authorities, however, see no cause for alarm and no signs yet of an epidemic. At this time last year, they point out, the number of cases was increasing sharply.

For the last week in June the total was 220.

Last year's epidemic did not fall off as abruptly or to as low a level as would be expected. Consequently during the early part of this year more than the usual number of cases were being reported. As the season for infantile paralysis approaches, the difference between the number of cases reported weekly this year and last year is increasing.

The greatest number of cases reported by any one state is 54 from Texas. Next highest figure is 16 from New York.

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ENGINEERING

Giant Sealed Tanks Now Transport Flour

► FLOUR for bakeries is now transported from mills in bulk, in giant sealed tanks mounted on flat railroad cars, three to a car. The tanks are filled and emptied through pipelines by air pressure without other handling. Greater economy in handling and transportation is one result of the new method, but more important is greater sanitation. Moisture, dust and vermin cannot get into the flour during loading, on the road in the sealed tanks, or in unloading. The method will probably come into wide use in postwar days for baking establishments that buy flour in 25,000-pound lots.

The new system is a development of the National Fitch Corporation, which functions as a research and sales division for specialized railroad equipment. Together with the tank is a one-man conveyor mechanism for transferring the tank to a truck-trailer for transportation to bakeries that do not have railroad sidings. The unloading equipment is made by the Fuller Company of Catawissa, Pa., which manufactures suction devices for handling grain and granulated products. It draws the flour directly into the receiving bins in the bakery.

When the tank of flour has to be transferred to a truck, a special conveyor platform is mounted on the trailer that works in conjunction with a similar conveyor under the tank on the car. A special 110-volt direct current generator, mounted on the truck and powered by the truck's engine, furnishes the electricity to operate the conveyor motor. The truck is parked parallel to the car, connecting hooks put in place, the generator started, a button pushed, the motor turns and the tank is transferred in 90 seconds.

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ORNITHOLOGY

Hummingbird Makes 75 Wing Strokes Each Second

See Front Cover

► THE HUMMINGBIRD is the incredible member of the bird group. This smallest of birds is able to move its wings so rapidly that a distinct hum is heard when it flies. It has been estimated that the ruby-throated hummingbird, shown on the front cover of this SCIENCE NEWS LETTER, makes about 75 wing strokes each second while it is flying. It is the only bird that is able to fly in reverse. It feeds on flower nectar and small insects. When it approaches a flower for nectar, it is able to hover in front of a blossom while it uses its needle-like beak and long tongue to reach the bottom of the flower. When it wishes to leave, it flies backward until the way is clear for forward flight. The photograph was taken by George A. Smith of Quarryville, Pa., at .001 a second.

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CARTOGRAPHY

Russians Made Map of Berlin While Besieged

► RUSSIAN cartographers in Leningrad prepared maps of Berlin while their own city was closely besieged by the Nazi army and German shells were bursting near the office where they worked. The story, illustrating the confidence with which the Red Army looked forward to victory even when the tide of war seemed to be running overwhelmingly against them, is related in the official *Information Bulletin* issued by the Embassy of the USSR in Washington, D. C.

Hungry and cold, the cartographers, draftsmen, engravers and printers got a great lift out of sealed orders received from the Supreme Command to draw up and print a new map in preparation for the eventual siege of Berlin. They got together all existing maps of the enemy capital they could find in Leningrad, and collated these with new data brought in by the Red Army's reconnaissance. When the break finally came, and the Russian forces surged westward, every officer had in his map case a new and accurate plan of the city they were to destroy and then occupy.

Science News Letter, July 14, 1945

IN SCIENCE

THE FIELDS

CHEMISTRY

Nobel Hevesy Returns Safely to Freed Denmark

► ONLY a day after his safe return to liberated Denmark from his war refuge in Sweden, Prof. Georg von Hevesy, winner of the Nobel chemistry prize last fall, fell and broke his ankle, an accident that confined him to Copenhagen's famous Finsen Institute.

Danes during the German occupation were not given the opportunity of knowing that one of their countrymen by adoption had won the high honor of the Nobel prize. Nazi censorship suppressed the news. Prof. Hevesy is a Hungarian of Jewish blood and his safety was threatened to such an extent that in October, 1943, when the persecution of Jews by the Nazis reached its climax in Copenhagen, both he and Prof. Niels Bohr, head of the Institute of Theoretical Physics, fled to Sweden.

Prof. Hevesy, who is a professor at Bohr's Institute, won the Nobel prize as the result of his work on the use of "tagged atoms" or isotopes in studying chemical and physiological processes. He once drank some water containing heavy hydrogen when it was not known whether or not this rare kind of the lightest element was poisonous.

Science News Letter, July 14, 1945

AGRICULTURE

U. S. Will Grow Turkish Tobacco This Summer

► TURKISH tobacco, which is skillfully blended with domestic tobaccos in making American cigarettes, will be grown on 55 small farms in North Carolina, Virginia and South Carolina this summer, following demonstration by scientists of Duke University and the agricultural experiment stations of these states.

Hitherto it has generally been considered impossible to grow the diminutive aromatic leaf in the United States. From 50 to 75 million pounds of Turkish tobacco are imported each year for blending with domestic varieties.

Cultivation of the Turkish tobacco in the test plots is hoped to determine experimentally whether a high quality product can be grown profitably. A large amount of hand labor is involved in both

growing and curing the Turkish variety. The leaves are more numerous, but are only a tenth the size of domestic tobacco leaves, and require considerable handling.

The Turkish plant thrives and produces best quality leaves on comparatively poor soil, so the areas where it is likely to be grown do not overlap those where the domestic leaf is cultivated.

The Turkish leaf brings a substantially higher price per pound than does the domestic leaf, but more hand-labor is involved. It has been shown that from 700 to 900 pounds of excellent Turkish leaves can be grown per acre.

The research program, underway for the last five years, has demonstrated that fresh seed need not be imported from the European growing regions each year. It had previously been thought that seed grown in the United States would not continue to produce plants which are true to type.

Turkish plants are placed close together, the closely spaced stalks producing a large number of small leaves. There are 55,000 to 60,000 Turkish plants per acre as compared to 5,000 to 6,000 domestic plants per acre. For six to nine prunings, at intervals of five to nine days, are required to remove all leaves from the stalk.

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LIMNOLOGY

Research Institute for America's Inland Seas

► ORGANIZATION of a new Great Lakes Research Institute, which will undertake to do for North America's five inland freshwater seas what is being done for the oceans by such laboratories as the Scripps Institution of Oceanography on the Pacific Coast and the Woods Hole Oceanographic Institution on the Atlantic, is announced in *Science* (June 29), by the Board of Regents of the University of Michigan.

The waters themselves, the rocky basins that contain them, their currents and other physical properties, and the animal and plant life forms that inhabit them, will be studied by a group of scientists trained in these special fields. Not all the investigators will be recruited from the University of Michigan; qualified men and women will be invited to participate in the research program wherever they may be found. Chairman of the new Institute is Prof. Paul S. Welch, limnologist.

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GENERAL SCIENCE

National Research Council Will List Laboratories

► INDUSTRIAL research laboratories of the nation are being listed by the National Research Council and new laboratories, especially, are being asked to provide information for this purpose.

Continuing a registry that showed 2,264 laboratories in existence in 1940, the new directory will include laboratories that improve products or reduce manufacturing cost as well as conduct fundamental and applied research.

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AGRICULTURE

Leaf Rust Disease Very Destructive This Year

► WHEATFIELDS in Oklahoma and Texas are taking a terrific beating from leaf rust disease, reports Dr. K. Starr Chester of Oklahoma Agricultural and Mechanical College, speaking on behalf of the American Phytopathological Society. This fungus, which is distinct from the species that causes black stem rust of grains, survived a mild winter and turned up on winter-wheat leaves 17,000 times more abundant this year than it was in the light rust season of 1944. Many thousands of acres of wheat in the Southwest have been given up as lost by the farmers; they have cut what is left for hay or plowed it under in preparation for a summer crop.

Dr. Chester fears that the rust spores, swept northward and eastward by summer winds, may spread disaster in the great grain areas still unaffected. His view, however, is not shared by scientists of the U. S. Department of Agriculture. They point out that the principal winter-wheat areas from Kansas northward are already well headed and approaching the ripening state. The long, cool temperatures have also slowed the growth of winter wheat to some extent, nevertheless the wheat has kept ahead of the fungi and seems now to be in fair position to finish several lengths ahead in the race.

It is still too early to state what may be the effects of a spread of leaf rust on spring wheat. However, in the main spring-wheat areas the varieties sown this year are resistant to known strains of both leaf-rust and stem-rust fungi.

Recent field surveys indicate also that infestation with wheat scab, another much-feared grain disease, is relatively light, at least in the central wheat area.

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CHEMISTRY

Oil, Mother of Chemicals

Better cosmetics, plastics, insecticides, and automobiles will result from advances recently made in the petroleum industry.

By MARTHA G. MORROW

► YOU WILL probably be able to get more mileage from your gas after the war; keep your home more nearly free of flies, mosquitoes and other pests; have a brighter, shinier car; and find your bread fresher in its waxed container because of advances recently made in the petroleum industry.

Better lipstick and face creams for the ladies, storm coats and fishing boots for the men, may also result from war-inspired developments in gasoline byproducts, as well as more effective girdles for stout beauties, hotter "canned heat" for cooking hamburgers on picnics, and more efficient explosives for clearing farm lands and for building roads.

Already the Allies are benefitting from 100-octane gasoline, which enables a plane to fly farther on a given quantity of fuel, or to carry a heavier load, or to travel faster. Oils have been developed which will flow about as freely when the plane is in the stratosphere where the surrounding temperature is 60 degrees below zero as when the plane is just taking off from the desert with its air sizzling around 110.

Special war weapons such as the new oil incendiary bomb which has been causing so much damage in Japan's chief cities, the improved flamethrower which is credited with shooting around corners, and the smoke generator which quickly hides ships and factories from the airborne enemy, all have the petroleum industry to thank for part of their newfound effectiveness.

Flaming Jellied Gasoline

The flamethrower which has been so successful in routing Japs out of pillboxes spits out jets of flaming jellied gasoline. It can be aimed effectively whereas previous flamethrowers, using a petroleum liquid fuel, had to be fired down the wind and were risky to use.

The "gel gas," which sticks to whatever it strikes, is made by adding a gray powder to ordinary motor gasoline. This thickened oil increases the range of the weapon three-fold. Since the gel is just beginning to burn when it reaches the

pillbox, fire instead of just flame is really being thrown at the enemy. The fuel leaves the nozzle of the flamethrower, which weighs no more than a soldier's full pack, as a glowing rod of fire and flows much like water when the hose nozzle is set for a sharp stream.

Gel gas is also used in incendiary bombs which can destroy factory buildings and the machines in them. Although the flame temperature of magnesium, used in the bombs which fell upon London early in the war, is higher than that of gasoline, it was found that gasoline has a heat content almost twice that of magnesium and is thus better for starting destructive fires.

The bombs, which look like a piece of hexagonal pipe, can be packed into clusters of as many as 60, the clusters breaking open as they fall. The bomb is equipped with a fuse which begins its deadly work only upon striking the ground. It ignites a three- to five-second powder train which allows enough time for the bomb to come to rest on its side. The powder train explodes a mixture of

black powder and magnesium which hurls an ignited cheesecloth sock filled with the gel gas from the tail of the bomb; it strikes with such force that the sock is broken and flaming "goo" spread all around.

The bomb is kept right side up by a cloth tail streamer which flies out when the bomb falls free. This makes it possible to aim with greater accuracy. The streamer also slows the fall so that the bomb does not strike so hard as to keep it from exploding properly.

Smoke so concealing that enough can be quickly generated from two quarts of the liquid mixture to hide the average city block is protecting our men and positions overseas. Generated from a petroleum derivative, the oil fog comes out like steam from a locomotive safety valve and hangs over the area, hiding it completely. The smoke particles are so small that it would take tens of thousands of them, set side by side, to make a row one inch long.

The new smoke-making mixture, which has a petroleum base, is inexpensive to produce, plentiful to supply and entirely harmless to those whom it conceals. Men can breathe it, walk through it with their eyes wide open, and even smoke in it.



TO REFINING PLANT—A 12-inch pipe line is being laid to carry the "rock oil" from field to refining plant. Photographs from the new photographic library of the Standard Oil Co.



OIL SEARCH—Field geologists in their search for petroleum deposits are shown taking measurements in the Big Horns, Wyo.

Although these new petroleum-users were developed solely to help win the war, they find peacetime applications. Some believe that the smoke-generator may help protect crops by keeping orchards and fields from freezing when a cold wave suddenly begins to nip young buds. If you are "roughing it" for several days and run out of fuel for your stove, that postwar steak can still be done to a turn. Just make some "canned heat" similar to the gel gas by adding a little of the special powder to your motor gasoline.

Lower-cost cars for a given performance and increased mileage are expected to result from 100-octane gasoline. As much as 35 to 40 miles to the gallon will be possible—say three or four years after the war—when engines are built to get the most out of the new gas. With a slight modification of the engine head, existing cars could take reasonable advantage of gasoline approaching 100 octane, say petroleum officials.

Owners of new cars after the war may not appreciate improvements which have been made in high quality oils, but those who buy used cars will find that the engine runs more smoothly and lasts longer. Oils which resist oxidation, and are not as likely to cause piston rings to stick or to let varnish deposits form, have been obtained by adding as little as one to 2% of a metallic derivative of phenolic structure.

Lubricants have been developed from petroleum which more effectively keep

moisture out of delicate engine parts, thus protecting against deterioration billions of dollars worth of material shipped to all parts of the world. Some types of greases, which look as black and sticky as asphalt, not only prevent rust but tend to displace slight bits of moisture.

About 95% of the toluol, the second "T" in TNT, came during the last war as a coke byproduct. The first tank car of synthetic nitration-grade toluol was made in America just 16 months before the war broke upon us. Today most of the toluol used in our shells, bombs and torpedoes is made synthetically from petroleum. Toluol will probably be greatly used as a solvent for paints and dyes in the plastics industry after the war.

Raincoats which drape nicely about the figure and storm suits which keep out the cold and wet will probably be made after the war of synthetic rubber. Large quantities of synthetic rubber are now being made from butadiene (from petroleum) and styrene (from coal tar) to keep our tanks and jeeps rubber-shod. When peace returns this research may lead to more attractive shower curtains, and washable, long-wearing rubber sheets for baby cribs.

Petroleum Products

The various substances found in petroleum have different boiling points so that the various components may be separated by fractional distillation, or heating. Products from petroleum range from gases, for illumination, heat and synthetic rubber; light oil, which is used for gasoline and kerosene; medium oil, from which metallurgical and Diesel fuels are made; heavy oil, from which come insecticide sprays, paraffin wax and lubricating oils; to residues, which give us wood preservatives, tar for paving streets and airports, coke and emulsifiers.

Newer distillation units pass the petroleum vapors into a "bubble tower," divided into a number of sections. Substances such as heavy oils with higher boiling points condense in the lower sections and flow down through the tower. The hot gases from the furnace bubble through these liquid products, and the gasoline fraction passes out at the top of the column and is condensed separately. Other fractions are withdrawn at different levels. A variety of products may be made by separating and purifying these various fractions.

Catalytic cracking is often used to break down petroleum molecules and rearrange them chemically so as to produce more of certain desirable constitu-

ents. "Cat cracker" chemicals come in three sizes: lumps, granules and a powder fine enough to be handled as a fluid.

The "cat crackers" do not turn out 100-octane gasoline as a finished product, but produce the base stock for aviation fuel. When 100-octane gas is taken out, however, less remains for the numerous byproducts made from petroleum.

A number of these "cat crackers" have been built during the war. The production of 100-octane gas is now ten times as great as in 1942.

The octane number of gasoline is measured by the tendency of the fuel not to knock in use. One of the pure hydrocarbon components of petroleum, iso-octane, was discovered earlier to be free of knocks in the highest compression motor it was then possible to build. Another component, normal heptane, was found to knock under almost any circumstances. A fuel-rating scale was thus made with heptane as zero and pure iso-octane representing 100. Gasoline falling between these extremes is rated as if it had a certain percentage of iso-octane, the rest being the knock-creating heptane.

Much of the 100-octane gas today is made by taking iso-octane mixed with tetraethyl lead (which incidentally has an octane number greater than a hundred) and blending it with gas which is rated below 100.

Geologists agree that there are still huge quantities of undiscovered oil beneath our land. We will even end the war with more known oil reserves than before Pearl Harbor because new fields have been found. Engineers have already demonstrated that we can derive synthetic crude oil at reasonable cost from the great reserves of natural gas and the tremendous deposits of oil shale, of tar sands, and of coal and lignite. Oil which can be derived from these sources is believed by many to be enough to supply our needs at the present rate of consumption for more than a thousand years to come.

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DENTISTRY

More Than 200,000,000 Teeth Need Pulling

► AMERICANS over age three need 238,500,000 teeth pulled and 632,000,000 fillings made in their teeth, the subcommittee on health of the Senate Committee on Education and Labor has been informed. (turn page)

Do You Know?

In one summer, a single *fireweed* plant will produce 80,000 seeds.

Bodies of some postwar *cars* may be made of plywood.

The *muscle fibers* of man are approximately .001 inch in diameter.

The *cowbird* perches on cattle to feed upon insect parasites.

Leaf-cutter ants cultivate for food a certain fungus on balls of leaf tissue.

Some incubator-hatched *turkeys* never learn to eat without help; force-feeding is sometimes necessary.

The *bat* usually has a single young one at a time, and the mother carries it about on her aerial journeys.

The *saw* on a *sawfish*, which may be five feet long, is a weapon of defense, as with it dangerous sidewise strokes can be made.

Alcohol, made from molasses, sugar-cane and surplus sugar in Brazil, is mixed with gasoline and sold for motor fuel.

There are no *sulfa drugs* or even sulfonamides of any description in nature as far as is known; they are products of synthesis.

Many reports of the amount of *ozone* present in the air are inaccurate, due to the difficulty of knowing that it is ozone being tested, and not some other oxidizing matter.

Fresh-cut *saplings*, stood for about six hours in a tub containing a solution of chromated zinc chloride, zinc chloride, or copper sulfate, rot much more slowly in the ground when used as fence posts.

★ ★ ★ ★ ★ ★ ★ ★

WYOMING

A Summer to remember

The 900-acre Paton Ranch will give you trout-fishing in a mountain stream in the foothills of the Big Horn mountains, daily horseback rides along picturesque canyon trails and excellent food—most of which is grown on the ranch.

The region abounds in geological and historical interest—dinosaur bones, marine fossils and implements used by the Indians many years ago.

Write for illustrated, descriptive folder

PATON RANCH, SHELL, WYOMING

These and other estimated figures of the accumulated dental needs of the population were discussed at committee hearings on dental research and dental care bills. Chairman of the sub-committee on health is Sen. Claude Pepper of Florida.

Dental neglect among children aged six to 18 is such that, according to the estimates, only about 5,650,000 of the annual crop of 22,500,000 decayed teeth are filled.

The population over age three also has

AERONAUTICS

Planes To Be Tripled

► AIR-MINDED America will have ample aircraft in the near future for passenger travel, air express and mail. Nearly three times as many planes, with nearly six times the seating capacity, will be available for commercial uses as there were before the war when 409 new planes, now on order or on option, are ready for use. All 19 American airlines are increasing their facilities.

These 19 airlines of the United States expect to have 975 planes in their post-war fleets, it is revealed by the Air Transport Association of America. The planes will seat 36,180 passengers. They will provide greater speed, comfort and service than air passengers have ever experienced before. The additional planes will be new, not converted surplus military transports. It has been found, the association states, that the cost of conversion of military transport planes is greater than the cost of new equipment.

The giant of the new planes under order is a 320,000-pound craft, powered with six 5,000 horsepower engines, seating 204 passengers, and with a cruising speed of 340 miles an hour which will enable it to travel from New York to London in nine hours. A new Mars-type 165,000-pound flying boat, four-engined, carrying 106 passengers, will be able to cruise at over 200 miles an hour with a payload of 28,000 pounds for more than 3,000 miles.

Other new planes will have seating capacities ranging from 128 down to 14 passengers. Some will have cruising speeds up to 325 miles per hour. Several will weigh 100,000 pounds or over.

The new planes for overnight trips will have different combinations of state-rooms, berths and reclining chairs. They will have separate rest rooms for men and women. Wherever necessary all

an accumulated need for 39,500,000 crowns and bridges, 20,000,000 partial dentures (false teeth), 20,000,000 dental disease treatments and 125,000,000 prophylactic treatments.

Since 1940, one-third of the civilian dentists have gone into the armed services, the committee was further informed. Indicating the variation in availability of dental care, California in 1940 had one dentist for every 1,279 people while South Carolina had one dentist for every 5,263 people.

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planes will have pressurized cabins to maintain low-altitude conditions at "over-the-weather" heights, together with air-conditioning, thermostatic temperature control, and individual ventilation. Windows will be larger and better arranged for observation. Electric stoves and refrigeration will permit the serving of satisfying meals.

Many scientific war developments that gave American war planes advantages over those of the enemies will be incorporated into the new civilian commercial aircraft. Among these are radar and electronic devices which permit landing under practically zero ceiling and visibility, and avoid risk of collision by enabling pilots to see other planes even in the thickest weather.

Among the new instruments is the Sperry "Gyrosyn" compass, which is a gyro synchronized with a magnetic compass, giving much greater accuracy in navigation. Also there is a far-advanced, radio-aided system of airway traffic control, which will be vital when planes are landing and taking off six a minute at the larger airports.

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NEW "PICK-UP" CANE

Permits Disabled Persons To Pick Up Small Articles Without Painful Stooping.

NO OTHER CANE LIKE IT

The Mason "Pick-Up" is a light double purpose cane with concealed patented pick up mechanism that enables the user by simple finger pressure and without any stooping to easily pick up papers, pencils, cards, coins, etc. Proper balance and rubber grip tip insures safer walking. Use a beautifully finished Mason "Pick-Up" Cane yourself or as a perfect gift for a disabled service man or friend. Write today for FREE CIRCULAR and 3 DAYS TRIAL OFFER.

W. H. MASON Box 27, Leesburgh, Ohio



DUPLICATING A GERMAN VACUUM TUBE IN 3 DAYS

Just behind the battlefield, a telephone system lay dead. The retreating enemy, hoping to return, had not blown it up, but had taken with them its vacuum tubes. To put it back to work, the General ordered 1000 new tubes — spot delivery.

A sample tube was flown back to the United States and brought to Bell Telephone Laboratories. It was of German design, different from any American tube in both dimensions and characteristics. Could it be duplicated soon? The job looked feasible. Within three days, try-out models were on their way to Europe. Three weeks later, Western Electric Company had made and delivered every tube. They were plugged in; vital communications sprang to life.

Vacuum tubes are an old story for Bell Laboratories scientists. Back in 1912 they made the first effective high vacuum tube. Three years later, they demonstrated the practical possibilities of tubes by making the first radio talk across the Atlantic, pointing the way to radio broadcasting. Since then, they have developed and utilized the vacuum tube wherever it promises better telephone communication — there are more than a million in your Bell Telephone System.

Today, Bell Telephone Laboratories is solving many of the toughest tube problems faced by the Armed Forces. When the war is over, it goes back to its regular job—keeping American telephone service the best in the world.



BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting for our Armed Forces at war, and for continued improvements and economies in telephone service.



• This electrical replica of a heater-type pentode was made for use in German telephone repeaters.

MARINE BIOLOGY

DDT Checks Barnacles

► THE NEW insecticide, DDT, gives promise of eliminating barnacles from ships' bottoms and other marine structures. Barnacles failed to attach themselves in six months' time to wooden panels coated with a paint developed by Prof. R. E. Dimick, of Oregon State College.

This paint contained DDT, chemically dichlorodiphenyltrichloroethane, and no other known toxic substance. Control boards treated with the ordinary anti-fouling paints were heavily covered with barnacles and other salt-water fouling animals after three months' submersion in marine waters.

The anti-barnacle paint was one of a large group tested at the Yaquina Bay Fisheries Laboratory operated by the Oregon Agricultural Experiment Station. Since DDT is insoluble in water, the expectations are that its antifouling properties may greatly exceed the initial test period of six months. Studies are being continued to determine the efficiency of DDT as antifouling agent for marine

animal forms other than barnacles, as a control for wood-boring marine mollusks and crustaceans, and to ascertain if the insecticide exhibits differences in anti-fouling properties for the various species of barnacles.

Since barnacles now have to be scraped periodically from ship hulls and marine growths foul ships and reduce speed materially, the successful and practical development of the DDT antifouling paint would undoubtedly save millions of dollars annually.

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CHEMISTRY

Lignin Now Found Useful With Fertilizers

► LIGNIN, a by-product of pulp and paper mills that has long been regarded as "the largest waste in industry", is now found useful with fertilizers to add humus and organic matter to depleted soils, Robert S. Aries, research associate at Yale University, has revealed.

This new use of lignin, he says, is an "extremely important discovery, because of the tonnage involved." Lignin is an organic substance which, with cellulose, forms the chief part of woody tissue.

In addition to 2,000,000 tons of lignin now discharged annually by mills into streams and rivers, he asserted, sawmills and other woodworking plants throughout the country "can readily make available another 10,000,000 tons of wood waste which can readily be incorporated into fertilizers."

"As a result of present day experiments," he continued, "lignin may assume an important part in this nation's soil building and conservation program. It will be a 'wealth from waste' movement, since lignin at present pollutes the nation's rivers; as fertilizer, it will definitely aid in providing higher land values and richer soils."

The part played in soil improvement by using lignin with fertilizers is largely to supply organic matter.

"If lignin is used on presently fertilized soils which need humus and organic matter, it is estimated that the efficiency of these soils would be raised about 20%," he said.

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BOTANY

NATURE RAMBLINGS

by Frank Thone



Growths of Evil

► RAGWEEDS are getting fairly into bloom about now, over the northern part of their range. In a few weeks their waves of windborne pollen will sweep southward to the Gulf, and the sorrowful season of sneezes and bleary eyes will be on for thousands of hayfever sufferers. There will be no real letup until frost, for even though many municipalities now conduct summer weed-mowing campaigns, ragweed pollen grains are so light that they float for miles on the wind, and there are plenty of sources out in the country to keep the air of even the largest cities most dolefully contaminated.

Why ragweeds should bear the responsibility for nine-tenths of summer hayfever cases is still more or less of a mystery. To be sure, there are enormous quantities of both tall and low ragweed, and both species are prolific producers of pollen. However, other windborne pollens, such as pine and spruce, are often much more abundant than ragweed pollen, at least in certain regions, yet these tree species seem to cause few if any cases of hayfever. There simply seems to be some specific malignancy in the ragweed.

THE SCIENTIST IN ACTION by W. H. GEORGE
A SCIENTIFIC STUDY OF HIS METHODS

This book is for those who need to do ORIGINAL thinking, CLEAR thinking, THINKING WITH A PURPOSE. Helps you to DISCOVER ideas, tells you how to DEVELOP them! Explains clearly METHODS OF WORKING to get RESULTS.

H. G. WELLS Writes To The Author "... I took up your book about a quarter to eight. At nine my parlour maid came to ask if I wanted any dinner tonight. It is now close on to midnight. But I realize now that your book is of the UTMOST IMPORTANCE and I feel truly sorry to you... Most respectfully yours, H. G. Wells

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pollen itself—some quality in its protein that makes it easier for human mucous membranes to react to it in that still-mysterious chemical behavior known learnedly, but not at all understandingly, as sensitization.

This touchiness of many persons' respiratory tracts to ragweed pollen has made ragweeds a profitable crop for at least a few hardy-nosed individuals. They hand-harvest quantities of it for a few pharmaceutical manufacturing concerns that use the pollen in immunizing preparations—more or less on the hair-of-the-dog-that-bit-you principle. A number of other hayfever-causing pollens are similarly harvested, but the most important by far are the ragweed pollens.

Hayfever is very definitely a disease of civilized communities. So long as our country was in the pioneer stage of development there was far less hayfever than there is now. Ragweeds do not thrive at all in the forest, and did but ill on the unbroken sod of the virgin prairie. They are primarily weeds of disturbed soil, growing most lustily on neglected road-edges and in ill-cultivated field-corners. The low ragweed also springs up in cut-over or burned-over forest areas, and in over-loaded pastures where the sod has been gnawed and trodden thin. So if we complain of these bad neighbors, the ragweeds might readily answer, "Well, it's your party—you invited us!"

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The findings, it is pointed out, reflect only what the men report about their health and may not reflect its true state. Exaggerations may have been made consciously or unconsciously.

The longer the men served in the Army, the more likely they are to think their health was affected. Those who saw overseas service think they are sicker than those who did not. There is a "distinct suggestion" that the men think their ill health is permanent.

"Active measures will have to be taken if this attitude or state of affairs is to be influenced," the report states.

What the future holds cannot be predicted, it is stated. Various conditions may work in opposite directions. Time may bring some improvement in health. The end of the war may cause a change in "intrapsychic tension and need for illness." Employment is easy to secure now. If there is increased competition for fewer jobs after the war, that will influence the adjustment of these men, as will the socioeconomic condition of the postwar world.

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Books of the Week

► THE UNITED STATES QUARTERLY BOOK LIST, Vol. 1, No. 1, March 1945 Library of Congress (Government Printing Office), 64 p., 35 cents. To carry to the other American republics information about selected U.S.A.-published books, this serial has been established officially with an advisory committee representative of scholarly scientific and library agencies. Of a high order of editorial execution, the notices are informative and usefully critical. One has to search for classifications that might interest a SNL reader, for archaeology is under fine arts, psychology is under social sciences, while medicine, along with hygiene and public health, are tucked away in biological sciences, and engineering is labeled technology. Many books that will be of immense value to our good neighbors are unlisted as presumably must be the case in a selected listing. But a relatively complete listing in 6 point type might be justified.

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complete reconstruction and modernization of Charles E. Plunkett's ELEMENTS OF MODERN BIOLOGY.

TELEVISION PROGRAMMING AND PRODUCTION—Richard Hubbell—Murray Hill, 207 p., illus., \$3.

TOWARDS FREEDOM IN THE AIR—United Nations Information Office, 31 p., paper, 10 cents. The story of the international civil aviation conference.

WHAT IS LIFE? The Physical Aspect of the Living Cell—Erwin Schrodinger—Macmillan, 91 p., illus., \$1.75. Based on lectures delivered under the auspices of the Institute at Trinity College, Dublin, in February 1943.

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PSYCHIATRY

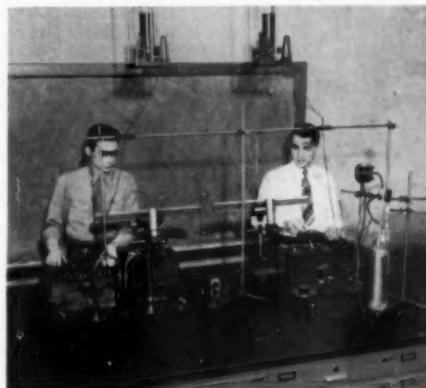
NP Dischargees Think Service Affected Health

► MEN discharged from the Army because of psychoneurosis in general think their health was impaired by their Army service. They think of their health impairment chiefly in terms of physical disease and in general do not recognize the psychologic aspects.

These are among findings reported by Lt. Col. Norman Q. Brill and Col. William C. Menninger, Army Medical Corps, and Miss Mildred C. Tate, American Red Cross psychiatric social worker, in the *Journal of the American Medical Association*, (June 30).

The findings result from questionnaires answered by 4,178 men of some 5,000 questioned.

The "vast majority" of the men, 85.9%, are working. More are unemployed now, however, than were unemployed at the time of induction. Before induction 93.7% were employed. Those who are not working blame this on their poor health.



CALIBRATING THERMOCOUPLES WITH MUELLER BRIDGE

A mid-western educational institution's Chemistry Dept. contains the above laboratory for calibrating thermocouples.

The couple's thermal electromotive force is accurately measured with the Type K-2 Potentiometer at right, and the equivalent temperature is established by a certified resistance thermometer and the Mueller Bridge at the left.

These two instruments are a particularly quick, dependable and economical team. For details, write us or see Catalogs E-33A(1) and E-50B(3), sent on request.

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•New Machines and Gadgets•

• **COMBINATION** stool and kit bag has an ordinary pivoted frame and canvas seat, but suspended under the seat is a commodious bag opening on the ends, suitable for carrying lunches or small working implements. Flat leather or-fabric handles on the sides are used for carrying.

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• **PHOTOELECTRIC** crack detector, to inspect glass jars and bottles to be used as food containers, automatically singles out and rejects those that have minute cracks or surface irregularities as they pass by on a rotary turntable. Only those safe for airtight sealing are accepted.

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• **HEARING** losses can now be tested by enclosing each ear in a soundproofed box containing a small loudspeaker. The box cuts out random noises, and the sound from the loudspeaker can be regulated. It is particularly effective in discovering a marked loss of hearing in one ear only.

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• **FACTORY TRUCK**, with an elevator arrangement on the forward end from which two heavy horizontal prongs project, carries coils of wire around a shop where much wire is used. The prongs stick through the coils. Boxes are carried resting upon the prongs or suspended by tongs under them.

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• **VIBRATRON**, shown in the picture, is a new precision instrument versatile enough to help in many industrial problems, including measuring a wide range of physical qualities such as temperature and pressure, and in the audio-frequency field. A stretched wire in an electro-magnetic field is the actuating element.

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• **BOOK COVER**, and support to hold a book in an inclined position when

Question Box

AERONAUTICS

How many planes will there be for passenger travel in the postwar period? p. 28.
What plane is capable of five miles a minute? p. 23.

AGRICULTURE

In what states will Turkish tobacco be grown this summer? p. 25.

ASTRONOMY

How are "hidden" stars now studied? p. 22.

DENTISTRY

How many teeth in this country need pulling? p. 27.

ENGINEERING

How is it possible to have tires that are good for 100,000 miles? p. 21.

GENERAL SCIENCE

What type of laboratories will be listed by the National Research Council in the future? p. 25.

Where published sources are used they are cited.

MEDICINE

How successful has neostigmine been in the treatment of infantile paralysis? p. 20.
What treatment completely banished the pain and other symptoms of trench mouth? p. 21.

ORNITHOLOGY

How many wing strokes does the ruby-throated hummingbird make each second? p. 24.

PHYSICS

Why is the Nazi story of a stratosphere platform so fantastic? p. 22.

PHYSIOLOGY

What seems to be the answer to the question of how living muscles contract and relax? p. 19.

PUBLIC HEALTH

How will civilians be able to get blood plasma in the future? p. 23.

VOLCANOLOGY-AERONAUTICS

How will Paricutin be investigated? p. 19.

resting on a table, is stamped from one piece of material, then folded in the same manner as the ordinary cover. This new cover, however, has triangular pieces on the two faces that may be folded downward to form supports.

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• **GERMICIDAL SOAP**, effective, non-toxic and non-irritant, is possible with a germicide that retains its full bacteria-killing properties in almost any soap. The soap should contain a fairly large amount of coconut oil fatty acids to be effective against typhoid and other intestinal tract germs.

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If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 267.

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